

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

In re Application of
Bernd Zschke et al.
Serial Number 10/530,707
Filed: April 8, 2005
For: Method Producing Rigid Polyurethane Foams By Means Of Graft Polyhydric Alcohols

DECLARATION UNDER 37 CFR 1.132

I, Andreas Emge, a citizen of the Federal Republic of Germany and residing at 49448 Lemförde, Federal Republic of Germany, declare as follows:

I am a fully trained chemist, having studied chemistry at the University of 97074 Wuerzburg, Federal Republic of Germany, from 1990 to 1996 and at the University of 89081 Ulm, Federal Republic of Germany, from 1996 to 1998.

I received my Doctors degree at the University of Ulm in 1998,

I joined Elastogran GmbH, 49448 Lemfoerde, Federal Republic of Germany, in 1999, since when I have been working in the field of polyurethane research and development,

I am well acquainted with technical English,

To demonstrate the advantages of the graft polyols according to the claims the above patent application and graft polyols as described in document US 2004/00114828 (Haider et al.) we made the following experiments:

We have prepared 3 polyurethane rigid foams.

All foams were made with the same catalyst package (53% Lupragen N100, 21% Lupragen N600, 26% Jeffcat PMDETA).

In Example 1 no graft polyol was used. In Example 2 graft polyol 1 based on a carrier polyol prepared by reaction of glycerin with propylene oxide and then ethylene oxide having an OH-number of 36 mgKOH/g had been used. The solid content (67% styrene, 33% acrylonitrile) was 44%. This polyol is very similar to polymer polyol C in US 2004/00114828 (Haider et al.)

In Example 3 graft polyol 2 based on a carrier polyol prepared by reaction of ethylene oxide and propylene oxide with vicinal TDA with an OH-number of 160 mg KOH/g had been used. The solid content (67% styrene, 33% acrylonitrile) was 45%.

The exact formulation is described below.

	Example 1 Reference	Example 2	Example 3
Sucrose/glycerine-PO polyol, Hydroxyl Number 450 mgKOH/g	48	48	48
TDA-EO-PO polyol, Hydroxyl Number 400 mgKOH/g	30	30	30
TMP-PO polyol, Hydroxyl Number 160 mgKOH/g	16		
Graftpolyol 1		16	
Graftpolyol 2			16
Catalyst package	2.1	2.1	2.1
Tegostab B8462	1.9	1.9	1.9
Water	2.3	2.3	2.3
cyclopentane (70%) / isopentane (30%)	13	13	13
Gel time [s]	39	36	35
Free rise density [g/l]	24.4	23.4	23.5
Polyol Viscosity [mPas]	6900	15700	12000
Compressive strength, foam sample 15% overpack [N/mm ²]	15.5	14.8	16.3
Demoulding thickness (after 3 min, 15% Overpack) [mm]	94.8	93.3	93.9
Thermal conductivity [mW/mK]	19.7	19.6	19.2
Flowability	1.31	1.34	1.36

Main results of this comparison are:

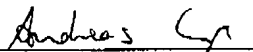
- Both graft polyols 1 and 2 lead to improved demoulding properties by about 1 mm. The demoulding is a rate for the cycle time for manufacturing the polyurethane foam. A higher demoulding thickness means that the cycle time is higher.
- The compressive strength (measured according to DIN 53421 / DIN EN ISO 604) of the foams prepared with graft polyol 1 (which is similar to Haider et al.) is slightly deteriorated compared to a reference foam whereas graft polyols 2 leads to an improved compressive strength.
- Other properties such as thermal conductivity and flowability are similar for all foams.

The polymer polyols used in US6117937 (Matsumoto et al.) are made with a carrier polyol prepared by reaction of glycerin with propylene oxide and then ethylene oxide having an OH-number of 33 mgKOH/g (polyol A). The only polymer polyol based on styrene/acrylonitrile particles is comparative example 2 (70% styrene, 30% acrylonitrile, solid content 20%). These polymer polyols are very similar to Haider's as they are using a typical flexible foam carrier polyol. Thus an expert would expect a similar performance of Matsumoto's polyols as in example 2 in our experiments.

This advantage of the graft polyols of our patent application could not be expected by the person skilled in the art.

I further declare that all statements made herein of my own knowledge are true and that all statements made on information or belief are believed to be true; and further that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Signed at 49448 Lemfoerde, Germany, this 7th day of January 2010


Signature of Declarant